**Class activity (Ch.8 K-NN)**

In this activity we apply distance-weighted k-NN (in fact, we use all points, not only k) to classify a new data point. The data set and the new point are given in the table below. Use DataSpell to do calculations.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Fruit no.** | **Height** | **Weight** | **Label/ Target** | **Dist. (Euclid)** | **1/Dist.^2 (Weight)** |
| 1 | 15 | 5 | Medium |  |  |
| 2 | 14 | 6 | Medium |  |  |
| 3 | 14 | 5 | Medium |  |  |
| 4 | 16 | 7 | Large |  |  |
| 5 | 18 | 6 | Large |  |  |
|  |  |  |  |  |  |
| New data | 16 | 6 | ? |  |  |

New\_data = [16, 6]

1. **Compute distances and weights**

Dist(New\_data , [15, 5]) = sqrt[ (16-15)^2 + (6-5)^2 ] = sqrt[ 2 ] = 1.41 🡺 weight = 1/(1.41)^2

Dist(New\_data , [14, 6]) =

Dist(New\_data , [14, 5]) =

Dist(New\_data , [16, 7]) =

Dist(New\_data , [18, 6]) =

1. **Use all data points (not only k-NN) to compute classification**

For class v = “Medium”:

For class v = “Large”:

A picture containing text

Description automatically generated

Plot the data to have a visual of what is going on.

